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Rydberg-atom electromagnetically induced transparency in strong magnetic fields[1] LU MA, University of Michigan, DAVID ANDERSON, RACHEL SAPIRO, RT LLC, GEORG RAITHEL, University of Michigan — We report on a rubidium vapor-cell Rydberg electromagnetically induced transparency (EIT) experiment in a 0.7 T magnetic field. We further discuss our progress towards manufacturing a miniaturized vapor-cell Penning trap. In the EIT scheme, all atomic levels involved are in the hyperfine Paschen-Back regime. The S-level Rydberg state further exhibits a strong diamagnetic interaction with the magnetic field. The isotope-mixed Rb cells allow us to explore both ^{85}Rb and ^{87}Rb EIT signals and to exploit differential features in magnetic-field measurement. A 0.2% relative uncertainty of the measured magnetic field is achieved by using the signals of both isotopes. The measured spectra are in excellent agreement with the results of a Monte Carlo calculation. Line shifts and broadenings due to small inhomogeneities of the magnetic field are included in the model. In order to further investigate the large Rydberg dephasing rates observed in this measurement, a room-temperature Penning-trap vapor cell is being manufactured using anodic-bonding methods. The compact design enables us to operate the Penning-trap cell in a strong magnetic field produced by permanent magnets, and to investigate Rydberg-atom interactions with trapped charges

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